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AAIKAI

ZN63(VS1)-12

Indoor high-voltage vacuum circuit breaker

Product User Manual

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one、Overview

1.1.1 The ZN63(VS1)-12 type indoor high-voltage vacuum circuit breaker (hereinafter referred to as the circuit breaker) (see Figure 1) is a three-
phase alternating current 50Hz, rated voltage 12kV indoor switchgear. It can be used for the control and protection of electrical equipment in
industrial enterprises, power plants, and substations.
1.1.2 The circuit breaker complies with China's national standards GB1984-89 "AC High-Voltage Circuit Breakers", JB3855-96 "3.6~40.5kV
Indoor AC High-Voltage Vacuum Circuit Breakers", DL403-91 "Technical Conditions for Ordering 10~40.5kV Indoor High-Voltage Vacuum Circuit
Breakers", and related IEC standards. Under normal operating conditions, it can ensure safe and reliable operation in the corresponding voltage-
level power grid.
1.1.3 The circuit breaker can perform frequent operations, has the ability for multiple interruptions and rapid reclosures, and features reliable
interlocking. The circuit breaker adopts an integrated design of the operating mechanism and the circuit breaker body. It can be used as a fixed
installation unit or equipped with a dedicated propulsion mechanism to form a handcart unit.

1.2 Model and Meaning

Indoor high-voltage vacuum circuit breaker

Indoorhigh-voltagevacuumcircuitbreaker

V S 1-12 / 630 - 25

- Rated short-circuit breaking current (kA)
- Rated current (A)
- Rated voltage (kV)
- Product design serial number
- Indoor
- Vacuum circuit breaker

Figure

1.3.1 Ambient air temperature: Minimum: -15°C, Maximum: +40°C, 24houraveragenotexceeding: +35°C
1.3.2 Ambient humidity: Daily average relative humidity: ≤95%, Monthlyaveragerelativehumidity: ≤90%, Daily average saturated vapor pressure: ≤2.2×10⁻³ MPa, Monthly average saturated vapor pressure: ≤1.8×10⁻³ MPa
1.3.3 Altitude: ≤1000m
1.3.4 The surrounding air should not be significantly contaminated by dust, smoke, corrosive and/or flammable gases, steam, or salt spray.
1.3.5 The seismic intensity should not exceed 8 degrees. Vibrations ormovementsfromswitchgear and control equipment external to the device can be neglected.
1.3.6 Special Operating ConditionsAccording to the national standard GB/T11022-1999 Common Technical Requirements for High-Voltage Switchgear and Controlgear Standards", the circuit breaker shall operate under normal conditions. If the user's operating conditions differ from the normal conditions, such as installation at an altitude exceeding 1000m, or in areas where the ambient air temperature exceeds the limits specified for normal operation or where high humidity may cause condensation, consultation with the manufacturer shall be conducted and mutual agreement reached.

two、Main Technical Parameters

2.1 Main Specifications and Technical Parameters Table

No.	Item		Unit	Value			
1	Rated Voltage		kV	12			
2	Rated Voltage		Hz	50			
3	Rated Insulation Level	RatedShort-DurationPower-FrequencyWithstandVoltage(1min)	kV	42			
		RatedLightningImpulseWithstand Voltage(peak)		75			
4	Rated Short-Circuit Breaking Current		kA	20	25	31.5	40
5	Rated Current		A	630 1250		630 1250	1250 1600
						1600 2000	2000 2500
						2500 3150	3150 4000
6	RatedShort-TimeWithstandCurrent4s (effectivevalue)		kA	20	25	31.5	40
7	RatedPeakWithstandCurrent(peak)			63		80	100
8	RatedShort-CircuitMakingCurrent (peak)			50	63	80	100
9	RatedThermalStabilityTime		s	4			
10	SecondaryCircuitPower-Frequency WithstandVoltage(1min)		V	2000			
11	RatedSingle/Back-to-Back CapacitorBankBreakingCurrent		A	630/400			
12	RatedShort-CircuitCurrentBreakingTimes		times	50			30(40kA)
13	MechanicalLife		times	20000			10000(40kA)
14	RatedOperatingSequence			O-t-CO-180s-CO			

*Note:For20kA,25kA,31.5kA,t=0.3s;(for40kA,t=180sandforcedaircoolingisrequired).

2.2 Main Specifications and Technical Parameters Table

No.	Item		Unit	Value	
1	Contact Gap		mm	11± 1	
2	Over-travel		mm	3.5± 0.5	
3	Contact Closing Bounce Time		ms	≤2	≤3(40kA)
4	Three-phaseandClosingAsynchrony		ms	≤2	
5	Average Opening Speed		m/s	1.1± 0.2	
6	Average Closing Speed		m/s	0.6± 0.2	
7	Opening Time (at Rated Voltage)		ms	≤50	
8	Closing Time (at Rated Voltage)		ms	≤100	
9	RatedOpening/Closing OperatingVoltage		V	AC/DC 110、220	
10	RatedVoltageofEnergyStorageMotor		V	AC/DC 110、220	
11	RatedPowerofEnergyStorageMotor		W	70	100(40kA)
12	Energy Storage Time		s	≤10	
13	Allowable Cumulative Wear Thickness of Moving and Static Contacts		mm	3	
14	Arcing Time		ms	≤15	
15	Opening Time		ms	≤65	
16	Main Circuit Resistance	630A	μΩ	≤50	
		1250A		≤45	
		1600~2000A		≤40	
		2500Aand above		≤30	
17	Contact Closing Contact Pressure	20kA	N	2000± 200	
		25kA		2400± 200	
		31.5kA		3100± 200	
		40kA		4750 250	

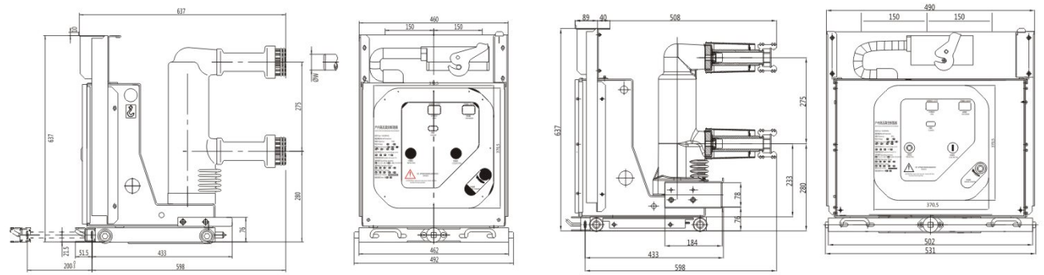
2.3 Parameters Table of Closing and Tripping Coils

Item	Closing Coil	Tripping Coil	Remarks
Rated Operating Voltage (V)	AC/DC 110、220	AC/DC 110、220	When the operating voltage of the tripping coil is less than 30% of the rated voltage, it shall not trip.
Coil Power (W)	245	245	
Normal Operating Voltage Range	85%~110% of rated voltage	65%~120% of rated voltage	

2.4 Energy Storage Motor Table

Model	Rated voltage (V)	Rated input power (W)	Normal operating voltage range (V)	Under rated voltage Energy storage time (s)
ZYJ55-1	DC 110 DC 220	70	85%~110% rated voltage	≤15

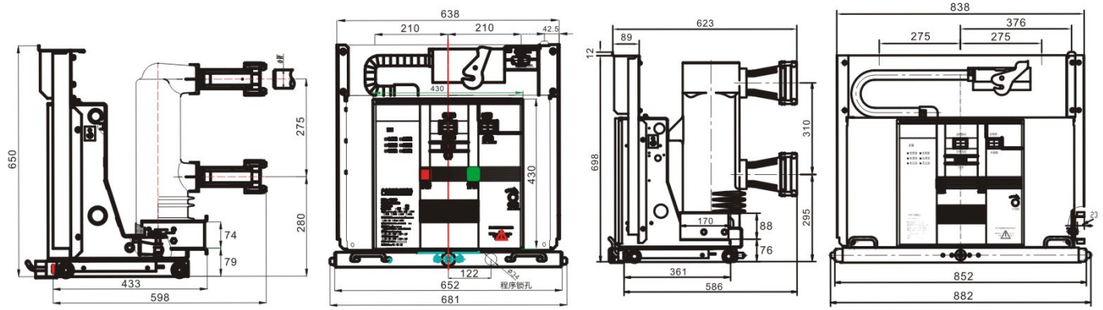
Three、Outline dimension diagram



The meshing size of the dynamic and static contacts shall not be less than 15mm, and the primary phase spacing shall be 150 ± 1.5mm

Rated current (A)	630	1250	1600
Rated short-circuit breaking current (kA)	20,25	20,25,31.5,40	31.5
Match with the size of the static contact (mm)	35	49	55

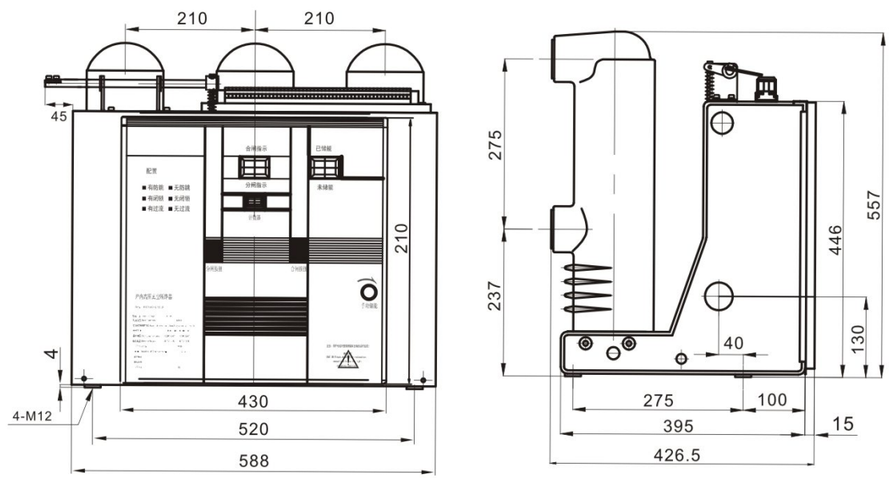
Figure 2-1 Dimensions of Handcart Type ZN63A (VS1) -12 (550-650)



The meshing size of the dynamic and static contacts shall not be less than 15mm, and the primary phase spacing shall be 210/275 ± 1.5mm

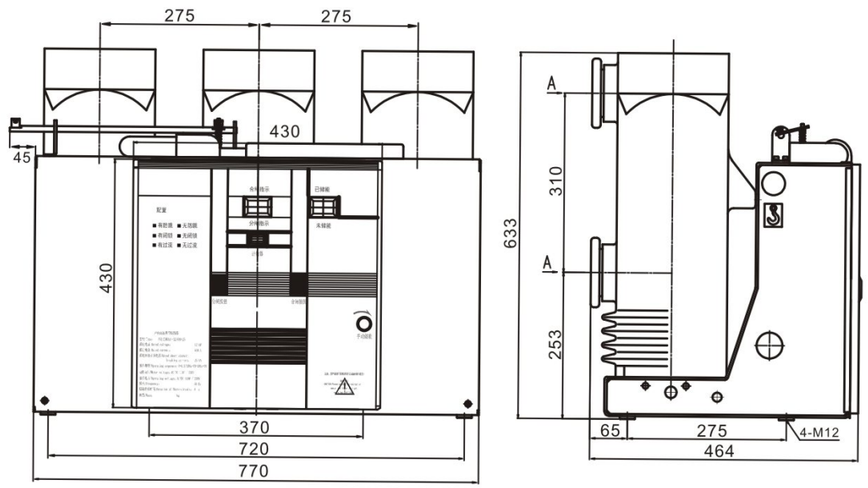
Rated current (A)	1600	2000	2500	3150	4000
Rated short-circuit breaking current (kA)	31.5,40	31.5,40	31.5,40	31.5,40	40
Match with the size of the static contact (mm)	79		109		

Figure 2-2 Dimensions of Handcart ZN63 (VS1) -12 (800-1000 Type)



Rated current (A)	630	1250	1600
Rated short-circuit breaking current (kA)	20,25	20,25,31.5,40	31.5

Figure 3-1 Dimensions of Fixed ZN63A (VS1) -12 (800 Type)



Rated current (A)	630	2000	2500	15	4000
Rated short-circuit breaking current (kA)	31.5,40				40

Figure 3-2 Dimensions of Fixed ZN63A (VS1) -12 (1000 Type)

four、Structural characteristics

4.1.1 Overall Structure of Circuit Breaker The overall structure of the circuit breaker adopts the form of operating mechanism and arc extinguishing chamber arranged in front and behind, and the main electrical circuit part is
Three phase floor standing structure. The vacuum arc extinguishing chamber is longitudinally installed inside a tubular insulation cylinder, which is cast with epoxy resin using APG technology
And it's done. It has strong anti creepage performance. This structural design greatly reduces the accumulation of dust on the surface of the arc extinguishing chamber, while also preventing
The vacuum arc extinguishing chamber is damaged by external unexpected factors, and can also exhibit high voltage effects in humid and hot environments as well as in severely polluted environments
Resistance state. When the circuit breaker leaves the factory, each current level is equipped with a dust-proof insulation cylinder cover, which helps prevent flashover and serves as a break
Additional protection against internal contamination of road equipment.
4.1.2 Operating Mechanism The operating mechanism is a flat spring energy storage type operating mechanism with manual and electric energy storage functions
The mechanism box is located in front of the arc extinguishing chamber, and the mechanism box of the circuit breaker is also used as the framework for the operating mechanism. The mechanism box is divided by four middle partitions
There are five assembly spaces, each containing an energy storage part, a transmission part, a release part, and a buffer part of the operating mechanism. The front part is equipped with
Closing and opening buttons, manual energy storage operation hole, spring energy storage status indicator, closing and opening indicator. In this way, the arc extinguishing chamber and mechanism are arranged in front and behind
Forming a whole, making the two more compatible, reducing unnecessary intermediate transmission links, and lowering energy consumption and noise, making the performance of the circuit breaker more efficient
Add reliability.
4.1.3 Vacuum arc extinguishing chamber circuit breakers are equipped with ceramic or glass vacuum arc extinguishing chambers, using copper chromium contact materials and cup-shaped longitudinal magnetic field contact structures
The electrical wear rate of the contact is small, the electrical life is long, the voltage resistance level of the contact is high, the dielectric insulation strength is stable, the recovery speed after arc is fast, and the current is cut off
Low level, strong breaking ability.

4.2 Working principle

4.2.1 Energy storage action (see Figure 4) The energy required for the circuit breaker to close is provided by the closing spring energy storage, which can be driven by an external power source to operate the energy storage motor
It can be completed automatically or manually using an energy storage handle.
Energy storage operation: The energy storage motor [15] fixed on the frame is powered on, outputs torque, and after deceleration, it is transmitted to the single unit through the motor output shaft [17]
Drive the transmission sprocket [14] towards the bearing [16], or insert the energy storage handle into the manual energy storage operation hole and shake it clockwise through the worm [11]
The worm gear [13] drives the drive sprocket [14] to rotate. Then, the chain [19] drives the energy storage transmission sprocket [24] to rotate, and the energy storage transmission sprocket
When rotating, the stop pin [2] pushes the slider [4] on the energy storage transmission wheel [6] to make the energy storage shaft [7] follow the rotation, and pull it through the two side connecting arms [22]
Extend and close the switch spring for energy storage. When reaching the energy storage position, the limit rod on the frame presses down the slider [4], causing the energy storage shaft to disengage from the sprocket transmission system
Open, the energy storage control lever [9] presses against the roller [8] to maintain the energy storage position, and at the same time [4], disengages the energy storage shaft from the sprocket transmission system, the energy storage control lever
Press the roller [8] to maintain the energy storage position, and at the same time, the dial [25] on the energy storage shaft drives the energy storage indicator to flip, displaying the "stored energy" status mark
Remember and switch the travel switch to cut off the power supply of the energy storage motor. At this time, the circuit breaker is in the ready closing state.
4.2.2 Closing operation (see Figure 4 and Figure 5): After the mechanism stores energy, if a closing signal is received, the closing electromagnet [12] will act (or press the closing button) to make
The energy storage holding shaft [20] rotates, driving the pawl [9] to release the roller [8], releasing the energy storage holding. The closing spring [10] releases energy, allowing the energy storage shaft to operate
[7] Rotate clockwise with the cam [23] on the shaft, and through the transmission connecting plate [37], the transmission connecting arm [35] drives the insulation rod [34] to drive the dynamic contact
Move the head upwards to enter the closing position and compress the contact spring [33] to ensure the required contact pressure of the contact. After the closing action is completed, the closing protector
The latch [39] is kept in the closed position with the half shaft [42], while the energy storage indicator and energy storage travel switch are reset, and the power supply circuit of the energy storage motor is connected,
The on/off indicator displays the "on" mark. If the external power supply is also connected, it will enter the energy storage state again.

five. Anti misoperation interlock

Circuit breakers can provide comprehensive anti misoperation functions. (See Figures 6 and 7)

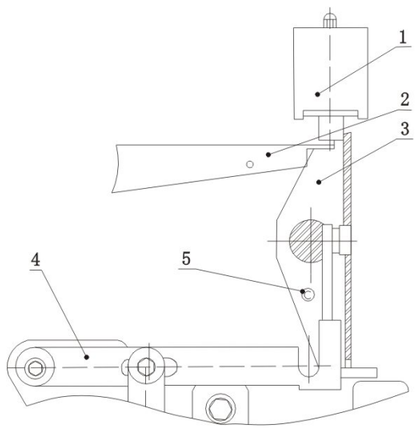
5.1 After the completion of the circuit breaker closing operation, the closing interlock plate [2] moves downward to hold the closing release plate [3] on the closing holding shaftWhen the switch is opened, it cannot be closed again.

5.2 After the circuit breaker is closed, if the closing electrical signal is not removed in a timely manner,the internal anti trip control circuit of the circuit breaker will cut off the closing circuitStop multiple reclosing.

5.3 When the handcart circuit breaker is not in the test position or working position, the pin [4] on the closing and releasing plate [3] is fastened by the interlocking bending plate [5] to open the circuitThe circuit breaker will not be able to close, preventing it from entering the load zone while in the closed state.

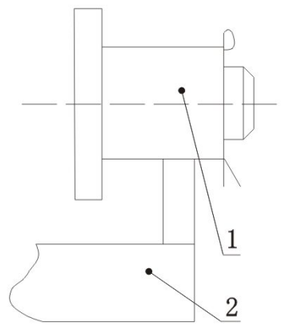
5.4 If electrical closing interlock is selected, manual closing operation shall be prevented when the secondary control power supply is not connected.

Note: The power consumption for closing and locking is 4.5W, and it can operate normally at 0.8 to 1.1 times the rated voltage.



1. Locking electromagnet 2. Closing interlock plate
3. Closing and releasing plate 4. Pin 5. Interlocking bending plate

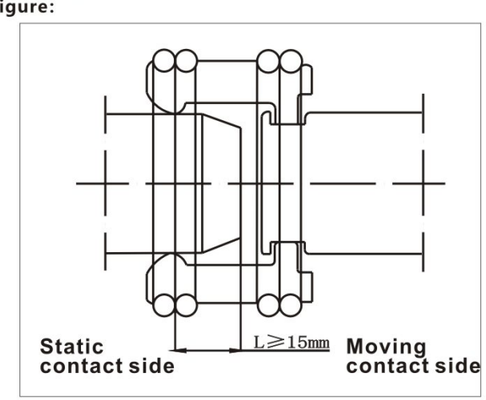
Figure 6



1. Pin shaft
2. Push through the interlocking bending plate of the mechanism

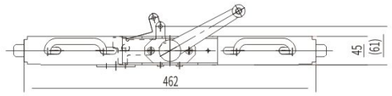
Figure7

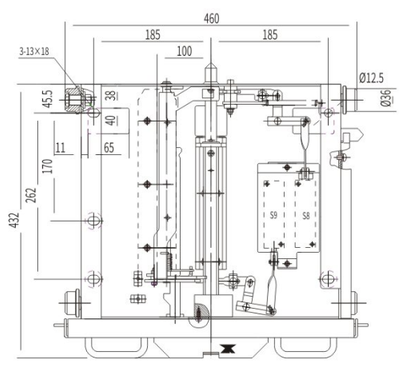
5.5 Matching dimensions of moving and stationary contacts are shown in the figure:

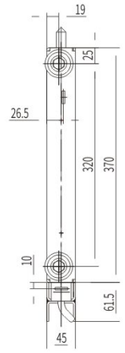


six. Grounding device assembly dimensions

The standard grounding method for ZN63 (VS1) -12 series handcart circuit breakers is friction grounding. As shown in Figure 13:







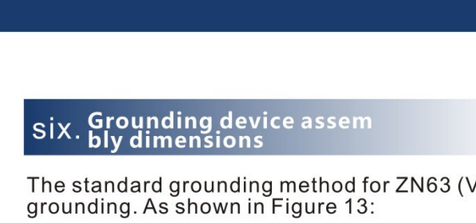


Figure8

	L1 (mm)	L2 (mm)	L3 (mm)
Cooperate with a phase spacing of 150/210mm	320	260	50
Cooperate with 275mm phase spacing	400	260	50

Note: The chassis grounding bar for the 150/210 phase distance circuit breaker is a single row, located on the left side.

4.2.3 Opening Operation

After the closing action is completed, upon receiving an opening signal or when the opening button is pressed, the opening trip solenoid or the overcurrent trip solenoid is activated. This action releases the constraint imposed by the opening half-shaft [42] on the closing latch [39]. Subsequently, the energy stored in the contact spring [33] and the opening spring [36] causes the moving and stationary contacts of the arc-extinguishing chamber [29] to separate, thereby achieving the opening operation. During the latter stage of the opening process, a hydraulic buffer absorbs the remaining energy of the opening process and limits the opening position. The on-off indicator displays the "open" mark. Meanwhile, it pulls the counter [46] to enable counting, and the transmission linkage switches the main and auxiliary switches.

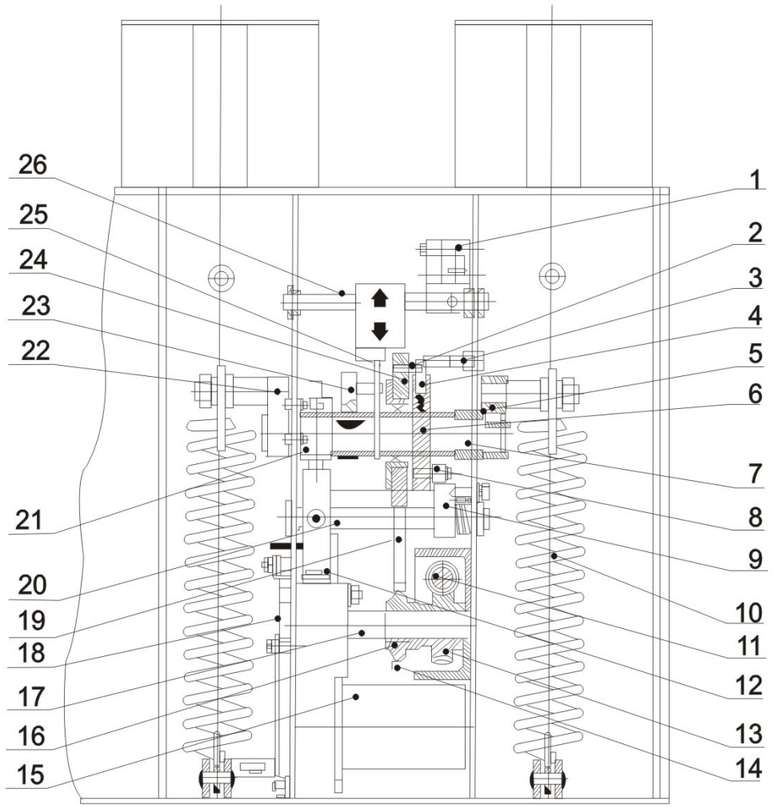


Figure 4

1. Energy storage in place for switching travel switch
2. stop pin
3. Limited rod
4. slider
5. Turning arm
6. Energy storage transmission wheel
7. Energy storage shaft
8. roller
9. Energy storage holding switch
10. Closing spring
11. worm
12. closing electromagnet
13. turbine
14. Motor drive sprocket
15. Energy storage dian'ji
16. Unidirectional bearings
17. Motor output shaft
18. Interlocking transmission bending plate
19. Transmission chain
20. Energy storage holding shaft
21. latching electromagnet
22. Turning arm
23. cam
24. Energy storage transmission sprocket
25. Dial board
26. Energy storage indicator sign

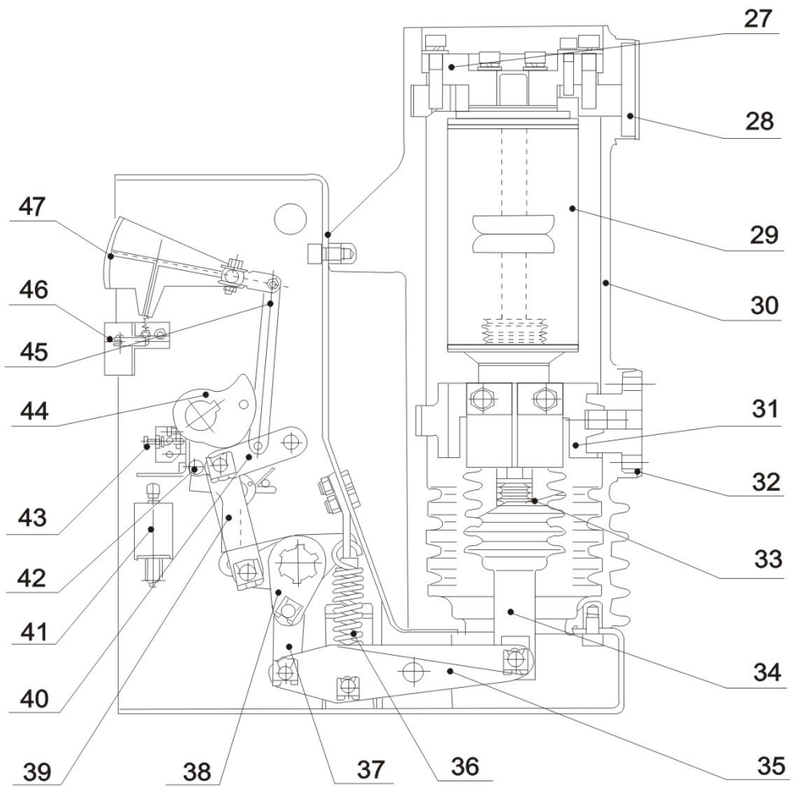


Figure 4

27. Upper bracket
28. Upper outlet socket
29. Vacuum Interrupter
30. Insulation cylinder
31. Lower bracket
32. Lower outlet socket
33. Contact spring
34. Insulation rod
35. Transmission crank arm
36. Opening spring
37. Transmission connecting plate
38. Spindle drive crank arm
39. Closing and holding switch
40. Connecting board
41. opening coil
42. Half axis
43. Manual opening top rod
44. Cam
45. Opening and closing signs
46. Counter
47. Opening and closing indicator

Note: When the circuit breaker is already in the closed position, or when the locking device is selected but the external power supply is not connected, as well as during the process of pushing in a handcart-type circuit breaker,
the closing operation cannot be performed. (The closing operation is prohibited in these cases.)

seven. Internal electrical schematic diagram of circuit breaker

7.1 The wiring diagram of the handcart circuit breaker is shown in Figure 9-1 (see Appendix A1)

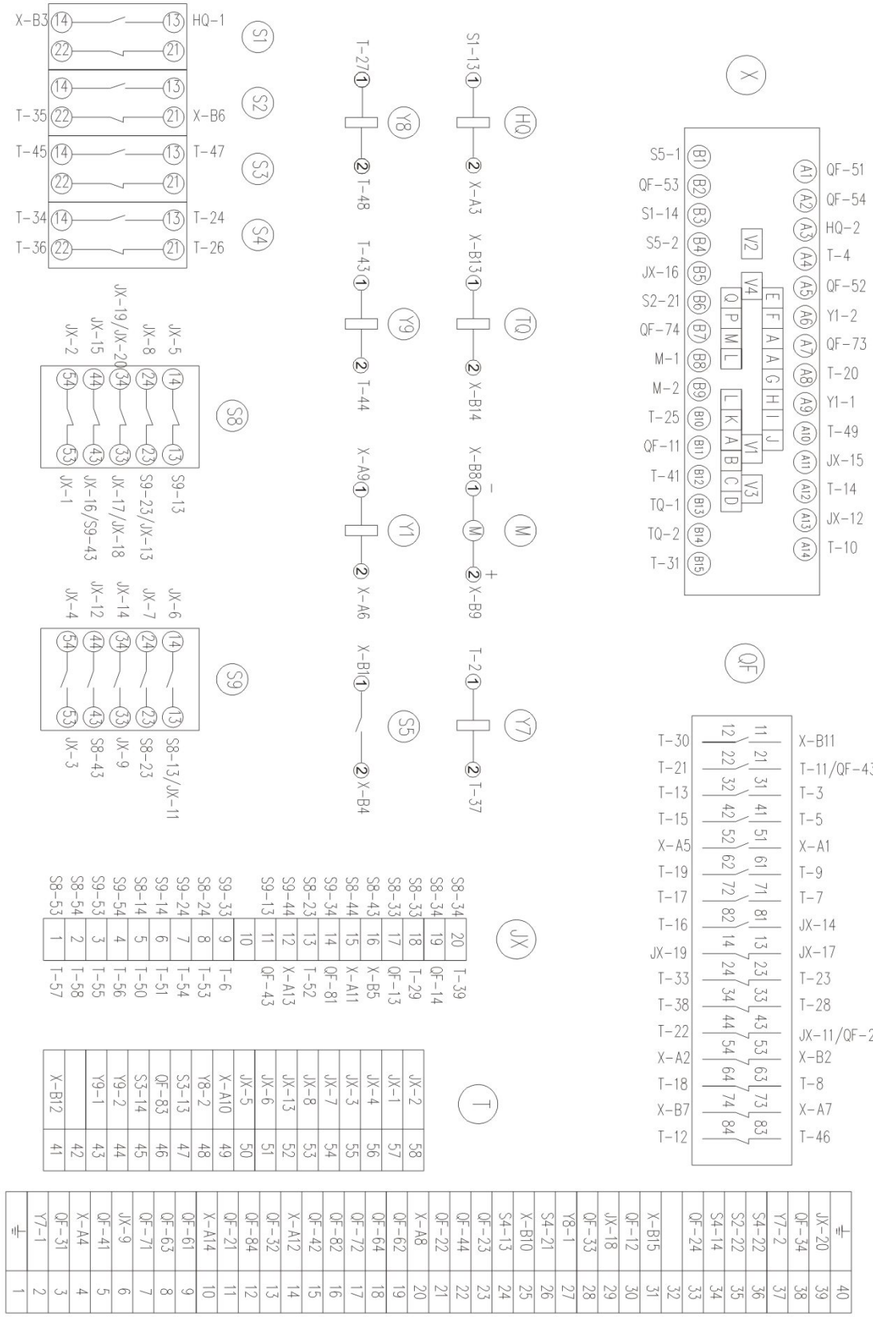


Figure 9-1 ZN63A (VS1) Handheld Wiring Diagram

7.2 The internal electrical schematic diagram is shown in Figure 9-2 (see Appendix A2).

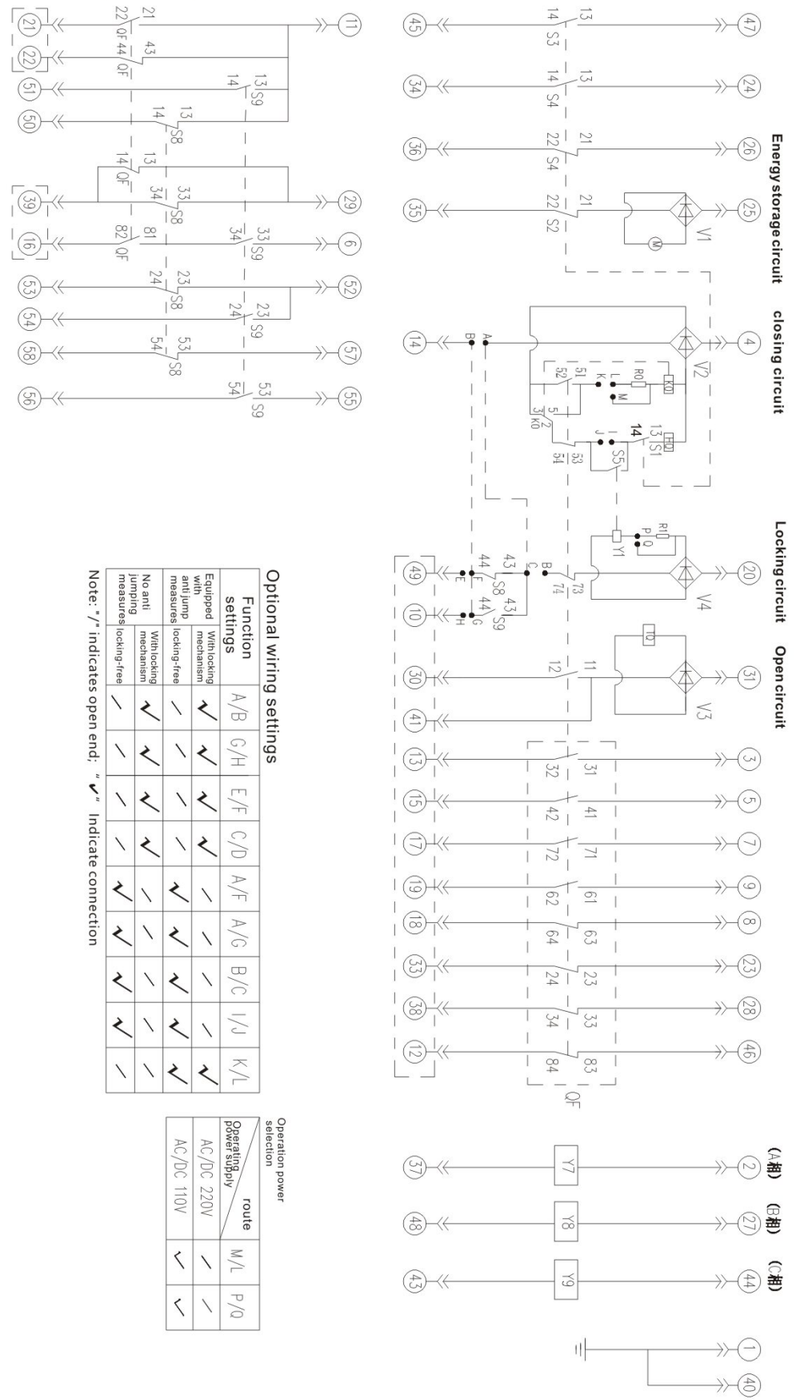


Figure 9-2 Internal Electrical Schematic Diagram of ZN63A (VS1) -12 Handcart

Optional wiring settings

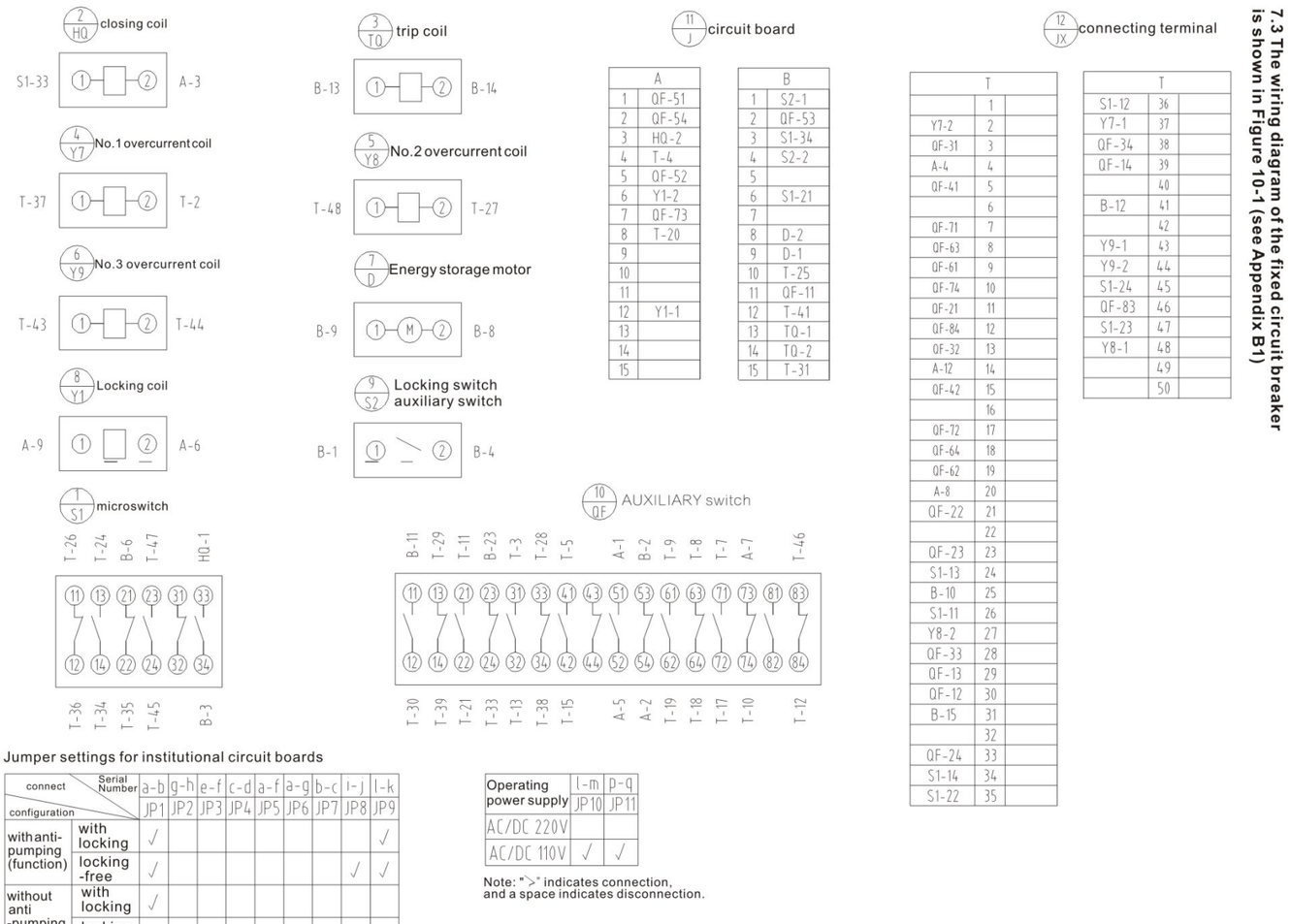
Function settings		A/B	G/H	E/F	C/D	A/F	A/G	B/C	I/J	K/L
Equipped with anti-jump measures	With locking mechanism	√	√	√	√	—	—	—	—	√
	locking-free	—	—	—	—	√	√	√	√	√
No anti-jumping measures	With locking mechanism	√	√	√	√	—	—	—	—	—
	locking-free	—	—	—	—	√	√	√	√	—

Note: "/" indicates open end; "√" indicate connection

Operation power selection

Operating power supply \ route	M/L	P/Q
AC/DC 220V	—	—
AC/DC 110V	√	√

7.3 The wiring diagram of the fixed circuit breaker is shown in Figure 10-1 (see Appendix B1)



A	
1	QF-51
2	QF-54
3	HQ-2
4	T-4
5	QF-52
6	Y1-2
7	QF-73
8	T-20
9	
10	
11	
12	Y1-1
13	
14	
15	

B	
1	S2-1
2	QF-53
3	S1-34
4	S2-2
5	
6	S1-21
7	
8	D-2
9	D-1
10	T-25
11	QF-11
12	T-41
13	TQ-1
14	TQ-2
15	T-31

T	
	1
Y7-2	2
QF-31	3
A-4	4
QF-41	5
	6
QF-71	7
QF-63	8
QF-61	9
QF-74	10
QF-21	11
QF-84	12
QF-32	13
A-12	14
QF-42	15
	16
QF-72	17
QF-64	18
QF-62	19
A-8	20
QF-22	21
	22
QF-23	23
S1-13	24
B-10	25
S1-11	26
Y8-2	27
QF-33	28
QF-13	29
QF-12	30
B-15	31
	32
QF-24	33
S1-14	34
S1-22	35

T	
S1-12	36
Y7-1	37
QF-34	38
QF-14	39
	40
B-12	41
	42
Y9-1	43
Y9-2	44
S1-24	45
QF-83	46
S1-23	47
Y8-1	48
	49
	50

Jumper settings for institutional circuit boards

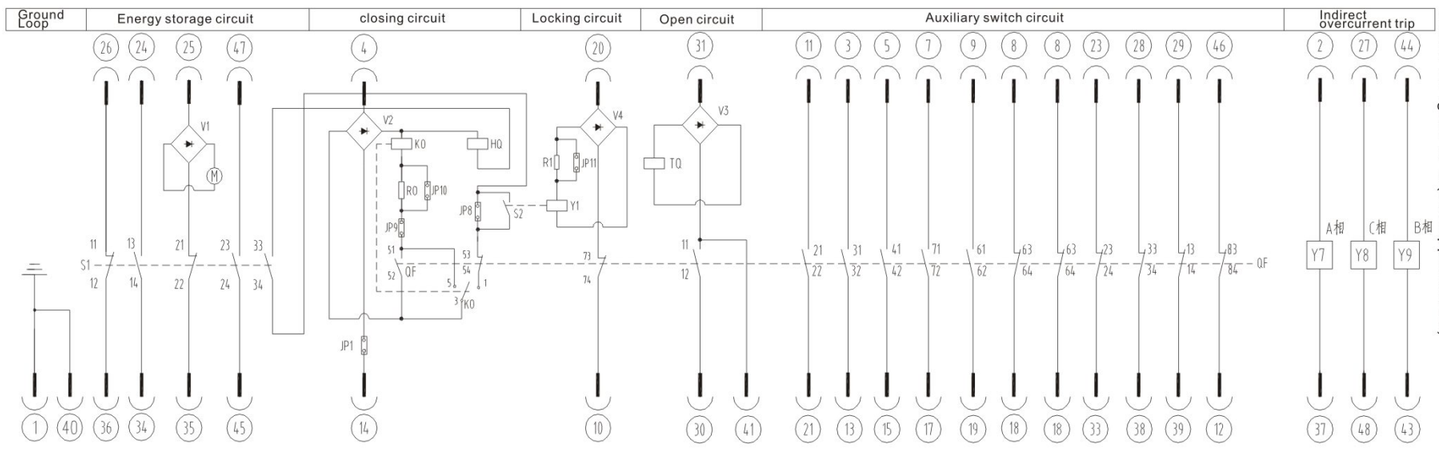
connect \ Serial Number / configuration		a-b JP1	g-h JP2	e-f JP3	c-d JP4	a-f JP5	a-g JP6	b-c JP7	i-j JP8	l-k JP9
with anti-pumping (function)	with locking	√								√
	locking -free	√							√	√
without anti -pumping (function)	with locking	√								
	locking -free	√							√	

Operating power supply	l-m JP10	p-q JP11
AC/DC 220V		
AC/DC 110V	√	√

Note: ">" indicates connection, and a space indicates disconnection.

Figure 10-1 ZN63A (VS1) Fixed Wiring Diagram

7.4 The internal electrical schematic diagram is shown in Figure 10-2 (see Appendix B2)



Jumper settings

connect \ Serial Number / configuration		a-b JP1	h-g JP2	e-f JP3	c-d JP4	a-f JP5	a-g JP6	b-c JP7	i-j JP8	l-k JP9	l-m JP10	q-p JP11
with anti-pumping (function)	with locking	√								√		
	locking -free	√							√	√		
without anti -pumping (function)	with locking	√										
	locking -free	√							√			
AC/DC 220V												
AC/DC 110V											√	√

Note: "└" indicates connection, and a space indicates disconnection .

symbol	name	symbol	name
V1~V4	Rectifier bridge stack	S1	Micro switch (switch after closing spring energy storage)
M	Energy storage motor	QF	Auxiliary switch (switching during opening and closing operations)
JP1~JP11	jumper	HQ	closing coil
K0	Anti bounce relay (optional)	TQ	opening coil
S2	Micro switch (realizing locking switching function)	R0~R1	resistance
Y1	Locking electromagnet (optional)	Y7~Y9	Indirect overcurrent release (optional)

Note:
The circuit breaker is in the state of no energy storage and in the open position

Figure 10-2 Fixed Internal Electrical Schematic Diagram of ZN63A (Vs1)

eight. Recommended Mating Dimensions between the Circuit Breaker and the Cabinet

8.1 The recommended mating dimensions between the circuit breaker and the cabinet with a width of 800 are shown in Figure 11 (refer to Appendix C1).

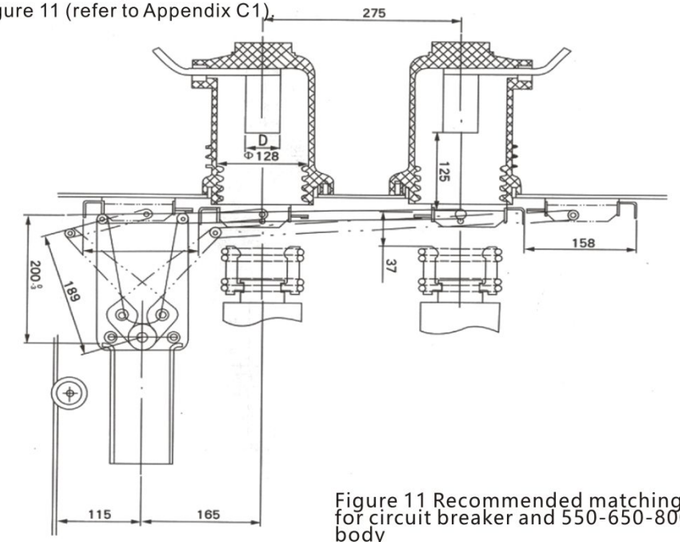


Figure 11 Recommended matching dimensions for circuit breaker and 550-650-800 wide cabinet body

Rated current (A)	630	1250	1600
Rated short-circuit breaking current (kA)	20,25	20,25,31.5,40	31.5
Dimensions of mating stationary contact (mm)	35	49	55

8.2 The recommended mating dimensions between the circuit breaker and the cabinet with a width of 1000 are shown in Figure 11 (refer to Appendix C2).

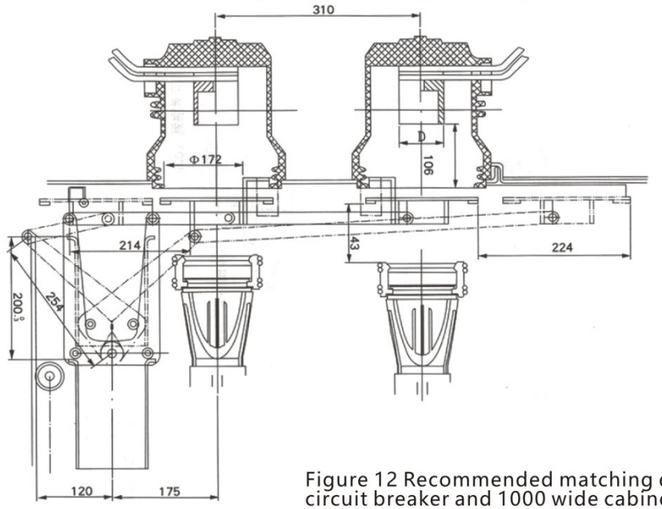


Figure 12 Recommended matching dimensions for circuit breaker and 1000 wide cabinet body

Rated current (A)	1600	2000	2500	3150	4000*
Rated short-circuit breaking current (kA)	31.5,40	31.5,40	31.5,40	31.5,40	40
Dimensions of mating stationary contact (mm)	79		109		

Note: 4000A requires forced air cooling

nine. Installation, Commissioning, and Operation

• ⚠ Careful and professional installation is a basic condition for ensuring the fault free operation of circuit breakers. All tasks involved in debugging and operation should be carried out by personnel who have received specialized training and have a detailed understanding of the performance of this switchgear. Corresponding protective and preventive measures must be considered in work.

• One of the prerequisites for fault free operation is to use the circuit breaker under normal working conditions in accordance with the relevant standards.

• The casing of the circuit breaker installed in the switchgear should not deform, and the wiring method of the electrical main circuit must ensure that the leads are not subjected to any pressure or strong force (such as possible influence from the busbar).

9.1 Preparation

9.1.1 Unpacking When lifting the circuit breaker from the packaging box, the lifting hook should be attached to the clearly marked lifting points on the circuit breaker. During lifting, the upper and lower outlet arms should not be subjected to force, and the circuit breaker should not be subjected to large impact vibrations.

Note: Before formal cabinet installation, please remove the lifting device as required.

9.1.2 Pre-installation Inspection

The circuit breaker has undergone strict factory inspections before leaving the factory, and all parameters meet the technical requirements. Before energizing the circuit for the first time, the following preparations should be made:

a. Check whether the circuit breaker is damaged or affected by any other hazardous environmental factors. If such phenomena exist, they should be eliminated first to restore normal working conditions;

b. Clean dirt, especially dirt on the surface of insulating parts. Use the power-frequency withstand voltage method to check the vacuum degree of the vacuum interrupter (for circuit breaker tripping, apply 1 minute of 42kV power-frequency withstand voltage between the contacts);

c. Check the connection status of the primary and secondary circuit wiring and the grounding body;

d. Use the energy storage handle to manually energize the spring;

e. Use the operating power supply to perform closing and opening operations on the circuit breaker;

f. Check the dust cover on the circuit breaker body;

For circuit breakers with a rated current 1250A, a dust cover should be installed; for those with a rated current

1600A, the dust cover should be removed.

9.2 Operation of the Circuit Breaker

9.2.1 Energy Storage of the Spring

a. The energy storage motor automatically performs energy storage. (If the energy storage motor is powered off, it can be manually continued and energy storage can be completed.)

b. When performing manual energy storage, use the energy storage handle to rotate the manual energy storage shaft clockwise until the energy storage status indicator shows that energy storage is complete (when the energy storage is completed, the energy storage mechanism will automatically release; then, no further operation of the energy storage handle is needed).

9.2.2 Closing and Opening

a. Closing: Operate the manual closing button or electrical control component.

b. Opening: Operate the manual opening button or electrical control component.

During each operation, the circuit breaker's counter [46] automatically counts. After completing an operation, from the observation window on the circuit breaker panel, the closing and opening position indicators will point to the respective positions of the circuit breaker.

The anti-pumping relay K0 (see wiring diagram) prevents the circuit breaker from continuously performing multiple closing and opening actions. For example, if there is a persistent closing command and a tripping signal from the electrical protection at the same time, the circuit breaker can only be closed after the persistent closing command disappears.

9.2.3 Operation of the Handcart-Type Circuit Breaker

Insert the handle into the push-in push-in hole. Rotate it clockwise to push in and counterclockwise to pull out, with a total travel of approximately 200mm. In the opening state, it should smoothly enter the working position or test position. Slowly rotate the handle. When a "click" sound is heard, it means it is in place (be careful not to use excessive force and damage the push-in mechanism). At the same time, connect the corresponding position indicating circuit.

9.2.4 Operation sequence

Operation sequence	Operation result		Possible follow-up actions
	Indicator position	Energy storage situation	
Connect the energy storage motor Automatic energy storage	○	Unrestored energy	Unified division
Circuit breaker closing	|	Unrestored energy	opening
Automatic Energy Storage	|	Stored energy	Split merge split or automatic
Circuit breaker opening	○	Stored energy	Unified division
Automatic reclosing sequence By protecting the operation of the system合 分 Automatic energy storage	○ | ○ ○	Stored energy Unrestored energy Unrestored energy Stored energy	(Automatic energy storage starts) Unified division

ten. Standard Configuration

10.1 Secondary control voltage: AC/DC 220V, 110V

10.2 Optional configurations for secondary control:

10.2.1 Anti-pumping device: Function - After the circuit breaker is closed, if the closing signal is not released in time, the internal anti-pumping control circuit of the circuit breaker will interrupt the closing circuit to prevent multiple reclosures. If a comprehensive protection device and an anti-pumping device are used on the cabinet, it is necessary to confirm whether the anti-pumping device needs to be installed.

10.2.2 Locking device: Function - Prevent closing when the secondary control power is not connected or is below the technical requirements.

10.2.3 Overcurrent device: Function - In the event of overcurrent or short circuit in a primary circuit, the overcurrent relay energizes the overcurrent coil to trip the circuit breaker. It is generally added to phases A and C, and sometimes to all three phases.

10.3 Electrical parameters of secondary components

Operating voltage 220V

	closing electromagnet	Opening electromagnet	latching electromagnet	Anti jump relay
loop current	<1.7A	<1.7A	<44mA	<18.3mA
Power (W)	<368	<368	<4.8	<1

Operating voltage 110V

	closing electromagnet	Opening electromagnet	latching electromagnet	Anti jump relay
loop current	<3.3A	<3.3A	<44mA	<18.3mA
Power (W)	<368	<368	<4.8	<1

Appendix D Common Faults and Causes of Circuit Breakers

Serial Number	Phenomenon	Fault Causes
1	The handcart cannot be pushed forward or pushed out	1) The circuit breaker is in the closed state; 2) The thrust handle is not fully inserted into the thrust hole of the chassis truck; 3) The thrust mechanism has not reached the test position completely, causing the tongue plate of the chassis truck to not unlock with the cabinet body.
2	Refusal to cooperate	1) The circuit breaker is in the non-energy-storage state; 2) The circuit breaker is in the closed state; 3) A closing interlock device is selected, but the auxiliary power supply is not connected; 4) The secondary circuit is inaccurate, or secondary components such as the auxiliary switch and closing electromagnet are damaged; 5) The handcart-type circuit breaker has not fully entered the working position or test position; 6) After being installed in conjunction with the cabinet body, the circuit breaker frame is deformed.
3	fail-to-break	1) The circuit breaker is in the open state; 2) The secondary circuit is inaccurate, or secondary components such as the auxiliary switch and opening electromagnet are damaged; 3) After being installed in conjunction with the cabinet body, the circuit breaker frame is deformed, resulting in a dead point during closing.

eleven. Routine matters

11.1.1 Delivery Conditions: All circuit breakers assembled by the factory must undergo a completeness inspection before leaving the factory and be subjected to factory tests in accordance with GB1984 to verify the correctness of their structure and function.

11.1.2 Packaging: Circuit breakers should be in the open state, and the energy storage springs should be in the non-energy-storage state during packaging. First, seal with a plastic bag, place an appropriate amount of desiccant inside, then fix on a wood-based board, and finally package with a plywood box.

11.1.3 Transportation: Circuit breakers must be loaded as a whole into a sealed packaging case and fixed during transportation.

⚠ (Note: a. Avoid impact; b. Avoid other destructive mechanical forces; c. The lifting device should be hooked into the lifting holes marked on the circuit breaker.)

11.1.4 Intermediate Storage: Circuit breakers must be stored in the open state with energy storage springs in the non-energy-storage state during intermediate storage.

Optimal conditions for intermediate storage:
A dry and well-ventilated storage room;
If there is basic packaging or original packaging, do not disassemble or damage the packaging;
Storage temperature not lower than 5°C;
Regularly check for condensation.
For circuit breakers without original packaging:
Cover with protective covering;
Maintain sufficient air circulation.

11.1.5 Maintenance and Upkeep

Maintenance work is intended to keep the switchgear operating without faults and to achieve the longest possible service life. The maintenance work consists of the following closely related parts:

Inspection - depends on the actual usage situation;

Maintenance - measures to keep the equipment in specific working condition;

Repair - measures to restore the equipment to specific working condition.

11.1.6 During normal use, the circuit breaker body should be inspected regularly. Clean the dirty and damp parts on the equipment surface, wipe the insulation surface with a dry cloth, and then use a cloth dipped in cleaning agent to remove other dirt (note that the cleaning agent should be suitable for plastics or synthetic plastics). All transmission parts should be lubricated regularly. Check the vacuum degree of the vacuum interrupter using the industrial frequency withstand voltage method. During the "voltage application" process, a slight glow on the outside of the interrupter is normal. If continuous puncture of the interrupter is found, the vacuum interrupter should be replaced.

11.1.7 When the circuit breaker is left unused for a long time, it may cause blockage in the moving parts of the circuit breaker. The energy storage and closing/opening operations of the circuit breaker should be performed at least 5 times each year.

11.1.8 During installation and use, it is strictly forbidden to impact the vacuum interrupter with hard objects.

11.1.9 Users should not arbitrarily replace electrical components with those of different specifications from the original model.

11.1.10 Operators should have a preliminary understanding of the structure, performance, installation, commissioning, maintenance, and repair knowledge of the circuit breaker and mechanism. Problems encountered during operation should be recorded, and the manufacturer should be notified if necessary.

11.1.11 For frequently operated locations, strict control should be exercised within the range of operating times and breaking times specified by the technical conditions. The equipment cannot be used continuously beyond its service life.

Note:

Maintenance work can only be carried out by personnel who have received training and are familiar with the characteristics of this switchgear.

During maintenance work, all auxiliary power supplies must be disconnected to eliminate the risk of electric shock.

11.2 Factory Documents and Attachments

11.2.1 Product User Manual / 1 copy

11.2.2 Product Qualification Certificate / 1 copy

11.2.3 Factory Inspection Report / 1 copy

11.2.4 Packing List / 1 copy

11.2.5 Energy Storage Handle / 1 piece

11.3 Ordering Instructions

Users should specify the following when placing an order:

a. Model, name, and quantity of the circuit breaker;

b. Rated voltage, rated current, and rated short-circuit breaking current of the circuit breaker;

c. Rated operating voltage (AC or DC) of the energy storage motor and the closing/opening coil;

d. Number of overcurrent release coils and the release current value;

e. Name and quantity of spare parts;

f. If users have any uncertainties or other special requirements, please contact the manufacturer.

1.After the switch is put into use, maintenance and inspection shall be carried out 1-2 times each year.

2.After each circuit breaking operation, an inspection shall be conducted. After three consecutive circuit breaking operations, a more thorough inspection shall be carried out.

Inspection and Quality:

One.Clean and inspect all components, and tighten all component screws.

1.All components should be free of oil, rust, deformation, and severe wear marks.

1.All tightening screws, washers, spring washers, and spring washers should be pressed tightly. The opening of the cotter pin should be appropriate, and the cotter pin should not fall off

two.Inspect supporting insulators, insulating pull rods, pressure-sensitive resistors, and grounding wires.

1.Insulators, insulating p ull rods, and pressure-sensitive resistors should be clean and free of oil.

2.Insulators, insulating pull rods, and pressure-sensitive resistors should be free of damage and discharge phenomena.

3.Grounding should be good.

three. Inspec t the vacuum interrupter and its electrical connections.

1. The vacuum interrupter should be undamaged, with a clean surface, free of dust, oil, and the protective cover at the vacuum seal should be intact and free of loosening or falling off.

2. The assembly of the interrupter's guide bushing should ensure the same axiality of the moving and static contacts.

3. When connecting the lower conductive plate") of the vacuum interrupter, excessive force should not be generated to prevent damage to the interrupter due to excessive force.

4. The connection between the vacuum interrupter's conductive rod and the conductive clamp should be tight. The clamp should be thick enough to ensure a gap of no less than 1MM on one side.

5. The soft connection surface should be flat, without burrs, and the surface should be free of dirt. The number of broken strands should not exceed 5% of the total number, and welding should be used for broken strands.

6. All conductive connections should be coated with neutral vaseline or conductive paste.

7. All conductive connections should not have overheating phenomena.

four. Inspect and adjust the operating me chanism.

1.All components should be free of deformation and wear; springs should be free of rust, cracks, breaks, and insufficient elasticity; the connecting shaft holes should fit well, and the rotating parts should be flexible and lubricated with oil.

2.The copper sleeves of the closing coil and the iron core of the closing electromagnet should operate flexibly without jamming.

3.The oil buffer should operate flexibly, without Jamming, and without oil leakage.

five.Inspect the auxiliary switches, micro-switches, and secondary circuits.

Auxiliary switches and micro-switches should be free of rust, breaks, and insufficient elasticity; the contacts should be clean and free of severe burning, and the contact should be reliable.

Auxiliary switches and micro-switches should be able to reliably switch circuits, operate flexibly, and have no resistance.

The secondary circuit wiring screws should be tight and free of oxidation and rust.

The Secondary plug socket should be free of deformation and burning, and the plug contact should be good and reliable.

It is necessary to ensure that the switch is not damaged by third parties during operation, and maintenance should be carried out 1-2 times each year.